1   {York Stenographic Services, Inc.}

2   RPTS TOOT

3   HIF083.170

4   THE INTERNET OF THINGS: EXPLORING THE NEXT TECHNOLOGY

5   FRONTIER

6   TUESDAY, MARCH 24, 2015

7   House of Representatives,

8   Subcommittee on Commerce, Manufacturing, and Trade

9   Committee on Energy and Commerce

10   Washington, D.C.

11   The Subcommittee met, pursuant to call, at 11:02 a.m.,

12   in Room 2123 of the Rayburn House Office Building, Hon.

13   Michael Burgess [Chairman of the Subcommittee] presiding.

14   Members present: Representatives Burgess, Lance,

15   Blackburn, Harper, Guthrie, Olson, Kinzinger, Brooks, Mullin,

16   Schakowsky, Cardenas, Butterfield, and Pallone (ex officio).

17   Staff present: Charlotte Baker, Deputy Communications

18   Director; James Decker, Policy Coordinator, Commerce,

19   Manufacturing, and Trade; Graham Dufault, Counsel, Commerce,

20   Manufacturing, and Trade; Kirby Howard, Legislative Clerk;

21   Paul Nagle, Chief Counsel, Commerce, Manufacturing, and

22   Trade; Olivia Trusty, Professional Staff, Commerce,

23   Manufacturing, and Trade; Michelle Ash, Democratic Chief

24   Counsel, Commerce, Manufacturing, and Trade; Christine

25   Brennan, Democratic Press Secretary; Jeff Carroll, Democratic

26   Staff Director; and Brendan Hennessey, Democratic Policy and

27   Research Advisor.

|

28   Mr. {Burgess.} The Subcommittee on Commerce,

29 Manufacturing, and Trade will now come to order. The chair

30 now recognizes himself for 5 minutes for the purposes of an

31 opening statement. And again, I want to say good morning to

32 everyone in the hearing room today and especially to our

33 panel of witnesses as we begin to explore the emerging market

34 in our digital ecosystem, the Internet of Things.

35   The Internet of Things marks a crucial juncture for the

36 U.S. economy and for American consumers as our country looks

37 for new economic engines and new sources for jobs. It

38 promises a world in which digital and physical elements

39 connect, gather information real-time, predict circumstances,

40 prevent problems, and create opportunities.

41   This morning some of us attended the Subcommittee's

42 Internet of Things showcase. We saw first-hand some of the

43 innovative ways that companies are using the Internet and

44 networked sensors to create, enhance, and customize products

45 to better meet consumer preference. I thank all of the

46 companies who participated in this morning's event.

47   The products and services displayed at the showcase

48 represent how, in just a very short period of time, increased

49   Internet connectivity, capability have led to the creation of

50   a vast ecosystem in which machines, devices, appliances, and

51   a whole host of other things are able to connect to the

52   Internet.

53   We may be most familiar with this concept in the context

54   of a connected refrigerator that lets us know what we need to

55   purchase on our next trip to the grocery store or a smart

56   watch that informs us when we have reached 10,000 steps or

57   met our caloric intake for the day or a video monitor in our

58   homes that can be watched remotely when traveling for work or

59   vacation. These types of ground-breaking technologies, among

60   many others, are providing valuable conveniences and

61   invaluable information to users.

62   And yet this is just the beginning. Much of the

63   excitement surrounding the Internet of Things lies in its

64   immeasurable scope and potential to touch everything, to

65   touch everyone, and every sector of the economy. We are

66   already seeing the fulfillment of this promise as this

67   technology expands to other areas and captures more than just

68   objects and things.

69   Internet connectivity is being integrated into

70   industrial processes, transportation routes, workforce

71 practices, buildings, and other operational systems and

72 entities across several different industries and

73 environments. This is improving, this is revolutionizing the

74 efficiency, productivity, and effectiveness of the way that

75 individuals, businesses, and governments are conducting

76 various tasks and responsibilities. The Internet of Things,

77 or the Internet of Everything, is fundamentally transforming

78 the way we operate and participate in today's world.

79   The market is still very young. The potential for

80 growth and innovation is at this point virtually limitless.

81 As a physician, I see this potential first hand in the

82 healthcare space. Medical professionals are able to interact

83 with patients in revolutionary ways through connected

84 devices, really devices that no one could have imagined just

85 a few short years ago. This technology is offering

86 opportunities to reduce healthcare costs, improve healthcare

87 quality, and most importantly, to save lives.

88   The significance of the Internet of Things is that these

89 types of benefits are not unique to healthcare. This

90 technology truly has the potential to transform every sector

91 of the economy in most profound ways. Notwithstanding the

92 economic and societal benefits of the Internet of Things, the

93   consumer impact of this market should be a key focus of our

94   discussion today. While consumers are benefitting from the

95   technologies, attention must also be given to appropriate

96   consumer protections for privacy and security.

97   Today we will explore these issues, and we should

98   recognize that not all devices are created equal. They are

99   manufactured for different purposes. They have different

100   capacities, and they generate varying levels and degrees of

101   consumer information. Unlike other established markets, the

102   Internet of Things is still developing, and quite honestly,

103   we are trying to understand the nature and basis of the

104   threats that face this ecosystem. In our examination of

105   privacy and security issues, it is important that we balance

106   these concerns with the creativity and innovation that is

107   driving this market. Too much potential for economic

108   progress and consumer welfare is at stake to act without a

109   full appreciation for what this market can offer.

110   [The prepared statement of Mr. Burgess follows:]

111   *************** COMMITTEE INSERT ***************

|

112   Mr. {Burgess.} I want to thank the witnesses again for

113   making time to be with us here this morning. I look forward

114   to an informative and engaged discussion on this very

115   important topic and now would like to yield back my time and

116   recognize the Subcommittee Ranking Member Ms. Schakowsky, for

117   the purpose of an opening statement.

118   Ms. {Schakowsky.} Well, you don't think often of events

119   in this building as being like really fun, and this is a day

120   that we can say that it is because the showcase down the hall

121   is very, very exciting. And we are going to hear about

122   things that I think certainly can enhance and spice up and

123   make our lives easier and better from incredible

124   entrepreneurs. So I want to thank you all for being here

125   today. I want to thank the chairman for holding the showcase

126   and the hearing.

127   I would like to take a moment to introduce one of our

128   witnesses, Brad Morehead, CEO of LiveWatch Security, which

129   does have a demonstration over in the showcase. It is an

130   innovative company from my hometown of Evanston, Illinois,

131   that uses the Internet of Things technology to better

132   protect, inform, and connect its customers. LiveWatch has

133   been honored with the 2014 gold Stevie Award for Customer

134   Service, the 2013 silver Stevie Award for E-commerce Customer

135   Service, and was recognized as an enterprise leader by The

136   Economist.

137   Mr. Morehead also participated in our showcase this

138   morning. I welcome him and thank him for his time today as

139   someone who often has people coming in and out of my house

140   who don't always know the code on my security system and

141   someone who regularly can't find her key. I want to tell you

142   that these kinds of technologies can mean a lot in my life.

143   The Internet of Things is one of the fastest-growing

144   technologies today. An estimated 25 billion products are now

145   connected to the Internet, and that number is expected to

146   double by 2020. Internet of Things technology brings very

147   clear benefits to consumers, vehicles that can tell a driver

148   if a part is in need of replacement, as the chairman

149   mentioned, refrigerators can tell a parent to buy another

150   gallon of milk, health gadgets that monitor a person's heart

151   rate, running or walking speed, distance covered. All of

152   these products and many more are made possible through the

153   Internet of Things.

154   But this technology also presents some new challenges.

155   How do we ensure that these technologies are secure? The

156   chairman was right to raise the question of the important

157   balance, that sensitive information doesn't get out to

158   unintended audiences or that products connected to the

159   Internet aren't remotely deactivated by an unauthorized user.

160   We must ensure that as this technology continues to grow we

161   take common-sense steps to assure that it is safe and secure.

162   These are issues worthy of the subcommittee's time and

163   consideration. Again, I look forward to hearing from this

164   distinguished panel about how they are creatively harnessing

165   the Internet of Things, and I would yield at this time for

166   Mr. Cardenas.

167   [The prepared statement of Ms. Schakowsky follows:]

168   *************** COMMITTEE INSERT ***************

|

169   Mr. {Cardenas.} Thank you. Good afternoon. I want to

170 thank the ranking member for yielding me some of her time. I

171 want to introduce Brian Van Harlingen, the Chief Technology

172 Officer at Belkin. Belkin is a local Los Angeles company,

173 and we are proud of them. And they have been doing a great

174 job as a driver for jobs and innovations in our great city.

175   Since the 1980s, Belkin has been on the forefront of

176 innovation creating products that benefit all of our

177 constituents in their daily lives. I look forward to

178 watching how Belkin will use what we are calling the Internet

179 of Things to bring new products and services to their

180 consumers, and I look forward to their testimony today. So

181 welcome to Washington, D.C., and thank you so much for your

182 testimony.

183   I yield back my time to the ranking member.

184   [The prepared statement of Mr. Cardenas follows:]

185 *************** COMMITTEE INSERT ***************

|

186   Mr. {Burgess.} Does the gentlelady yield back?

187   Ms. {Schakowsky.} Oh, I yield back.

188   Mr. {Cardenas.} Okay. Thank you.

189   Mr. {Burgess.} I thank the gentlelady. The chair now

190 recognizes the vice chairwoman of the Full Committee, the

191 gentlelady from Tennessee, Ms. Blackburn, 5 minutes for an

192 opening statement.

193   Mrs. {Blackburn.} Thank you, Mr. Chairman. And I

194 really do appreciate the attention to this issue and that my

195 colleagues on both sides of the aisle are willing to work on

196 this. We don't need to let this get away from us if you

197 will. And Mr. Welch and I have put a great deal of attention

198 on the privacy and data security issue for the past couple of

199 years and thereby have had the opportunity with our

200 colleagues to dig a little deeper into some of these issues.

201   Going back to the chairman's remarks, I think it is

202 important that we look at size and scope when we discuss the

203 Internet of Things. You can look at Cisco's report, 50

204 billion devices, 50 billion devices connected to the Internet

205 by the time we get to the end of this decade. And then you

206 layer upon that what the expectations are for global economic

207   output and contribution to the global economy from this. And

208   right now and by the time we get to 2025, they are saying

209    $2.7 to $6.2 trillion looking at that. So when you look at

210   size and scope and impact, it behooves us to say, okay, how

211   do we get our hands around this and make certain that we

212   approach this in a light-touch way, that we encourage

213   innovation? As Ms. Schakowsky said, we rely on a lot of

214   these, and people like this because it does add convenience

215   to our lives. But that accelerates the additional problem of

216   privacy and security, whether it is B to B or B to C, and how

217   that is going to be filtered data and how we are going to

218   mine it and what we are going to extrapolate and how we

219   protect that, how we anonymize it, et cetera, et cetera. We

220   have to realize that we are still running and hopefully

221   always will on an open-source platform. Go back to when the

222   Internet started, four known users, four disparate in varied

223   locations, all known one to another, all vetted, all secure.

224   So we want to be here to enhance that experience for the

225   50 billion items that are going to be attached and still

226   provide the underpinning and infrastructure that was there

227   when it was the initial project of four known users.

228   So we welcome you all. We are going to be direct with

229 our questions and probably a bit more conversational than

230 some of the other hearings that you participate in.

231   Mr. Chairman, I thank you for the attention to the issue

232 and look forward to the discussion. I yield the balance of

233 my time for whomever would like to claim it.

234   [The prepared statement of Mrs. Blackburn follows:]

235 *************** COMMITTEE INSERT ***************

|

236   Mr. {Burgess.} Does any other member of the Republican

237 side seek time? Seeing none, the gentlelady yields back her

238 time. The chair recognizes Ranking Member of the Full

239 Committee, Mr. Pallone, 5 minutes for an opening statement,

240 please.

241   Mr. {Pallone.} Thank you, Mr. Chairman. Today's

242 hearing gives us an opportunity to look at a new and evolving

243 technological development. The Internet of Things has great

244 potential for growing the American economy and offering

245 consumers new technology that will enrich their lives and

246 empower them in ways never before thought possible.

247   Earlier today, along with my colleagues, I had an

248 opportunity to see some of the innovation coming out of the

249 Internet of Things at a showcase hosted by the subcommittee,

250 and I was proud to have there IMPak Health, a New Jersey

251 company that is building wireless technologies into products

252 to solve practical healthcare needs. IMPak Health has taken

253 advantage of wireless technology to help ensure patients are

254 taking their medication and staying healthy. And the growth

255 in these types of devices is so rapid that they soon will be

256 as ubiquitous as electrical outlets. In fact, it is

257   estimated that there will be 50 billion connected products by

258   the year 2020.

259   But in many ways, the future is already here. Just last

260   Friday Tesla announced that it would remotely install

261   software updates in its Model S cars providing them with

262   capability of autonomous driving. Cars that drive themselves

263   were once found only in science fiction, but today it can be

264   a reality with a quick update sent over the Internet.

265   Yet, along with these innovations come some new

266   vulnerabilities, the vulnerabilities that we in Congress have

267   a responsibility to protect consumers against. Let us take a

268   hypothetical situation for a moment. Let us say that I wear

269   a bracelet that monitors different aspects of my health and

270   physical activity. It helps me keep track of how many steps

271   I take each day. It tells me how well I sleep at night. It

272   monitors my heart rate and along with an app in my phone, it

273   tracks where I have gone. While, all this data is important

274   to me, I may not want to have it released to a potential

275   employer who requires it as part of the job application. I

276   might not want the bracelet manufacturer selling it to an

277   insurance company who might then utilize it for my insurance

278   coverage, and I certainly do not want a hacker accessing the

279 bracelet to post my information on the Internet or to monitor

280 my location.

281   So without strong security and privacy protections,

282 consumers can be at real risk. These risks can have

283 devastating consequences when the product is accessed and

284 controlled remotely by an unscrupulous actor. One hacker has

285 shown that he can remotely access an insulin pump and induce

286 a lethal overdose. Others have shown that they can remotely

287 hijack the operations of a car, suddenly turning the wheel or

288 cutting off the brakes.

289   In order to protect consumers, there has to be strong

290 security and privacy protections built into these products.

291 By building in security, manufacturers can more effectively

292 prevent hackers from accessing a device or the data it

293 produces or collects.

294   At last week's hearing, the FTC's witness stated that

295 his experience in evaluating the vulnerability in Internet of

296 Things products has led the agency to recommend that device

297 security be added to data security and breach notification

298 legislation. By building in privacy, consumers could have

299 confidence in these products, and consumers need to know that

300 their intensely personal information will not be shared with

301   the world without their consent.

302   So I am confident great things will be done through the

303   Internet of Things, but I believe that while we encourage

304   innovation through these new technologies, we also have to be

305   innovative in how we protect the consumer. I yield back. I

306   don't think any other member on our side wants the time. So

307   I will yield--oh, you do? Okay. I will yield my remaining

308   time to the gentleman form California.

309   [The prepared statement of Mr. Pallone follows:]

310   *************** COMMITTEE INSERT ***************

|

311   Mr. {Cardenas.} Thank you very much. I would be remiss

312 if I didn't take this opportunity to thank Intel. So Ms.

313 Schooler, I just wanted to say thank you very much. Intel

314 made an announcement just a few months ago that they are

315 investing $300 million into their internal diversity

316 initiatives over at Intel, and I hope that would be a

317 starting point for all of the industries to follow suit as

318 these industries are growing. They are the jobs of the

319 future. And for Intel to make that commitment and that self-

320 assessment is just wonderful. And many people on both sides

321 of the aisle believe that industry does a great job when they

322 police themselves and when they look in the mirror and they

323 say we can do better. And I think this is a great

324 opportunity for us to remind everyone that self-reflection

325 and self-understanding of where we stand as individuals or

326 organizations in the community certainly would give us an

327 opportunity to step forward and say we can do better. And I

328 think Intel has done a tremendous job, and thank you for that

329 commitment.

330   Thank you. I yield back my time.

331   Mr. {Burgess.} The chair thanks the gentleman. The

332   gentleman yields back.

333   So again, we want to welcome all of our witnesses, and

334   thank you for agreeing to testify before the subcommittee

335   today. Our witness panel for today's hearing will include

336   Mr. Daniel Castro who is the Vice President of the

337   Information Technology and Innovation Foundation; Mr. Brian

338   Van Harlingen who is the Chief Technology Officer of Belkin

339   International; Ms. Rose Schooler, Vice President of the

340   Internet of Things Group and the General Manager of the

341   Internet of Things Strategy and Technology Office at Intel

342   Corporation; and Mr. Brad Morehead, the Chief Executive

343   Officer at LiveWatch Security.

344   You each are going to be recognized in turn for 5

345   minutes for the purposes of an opening statement. Mr.

346   Castro, we will begin with you. You are recognized for 5

347   minutes.

|

348 ^STATEMENTS OF DANIEL CASTRO, VICE PRESIDENT, INFORMATION

349 TECHNOLOGY AND INNOVATION FOUNDATION; BRIAN VAN HARLINGEN,

350 CHIEF TECHNOLOGY OFFICER, BELKIN INTERNATIONAL, INC.; ROSE

351 SCHOOLER, VICE PRESIDENT, INTERNET OF THINGS GROUP AND

352 GENERAL MANAGER, INTERNET OF THINGS STRATEGY AND TECHNOLOGY

353 OFFICE, INTEL CORPORATION; AND BRAD MOREHEAD, CHIEF EXECUTIVE

354 OFFICER, LIVEWATCH SECURITY, LLC

|

355 ^STATEMENT OF DANIEL CASTRO

356 }   Mr. {Castro.} Thank you. Thank you, Chairman Burgess,

357 Ranking Member Schakowsky, and members of the committee. I

358 appreciate the opportunity to discuss the Internet of Things

359 with you today.

360   The Internet of Things represents the idea that ordinary

361 objects will be imbedded with sensors and connected to the

362 Internet. While many of these changes will be subtle, over

363 the long term, this technology could ultimately have an

364 enormously positive impact on individuals, businesses, and

365 society. For example, consider healthcare. Individuals can

366 use connected devices to prevent, screen, and diagnose a

367 variety of medical conditions. By collecting and tracking

368 data about their health, individuals can identify health

369 problems sooner, get treatment faster, and save on healthcare

370 costs.

371   For example, patients can use smart pill bottles to

372 receive automated alerts when it is time to take a dose, and

373 these types of interventions can help decrease the rate of

374 medication non-compliance which costs the United States

375 almost $300 billion annually.

376   Or look at energy. The Internet of Things is helping to

377 provide solutions to the global energy challenge by enabling

378 clean energy technologies. For example, in home, connected

379 devices like smart thermostats can automate energy efficient

380 practices and save consumers money.

381   Or look at public safety. The Internet of Things helps

382 build not only smarter cities but safer cities. In homes

383 connected sensors can improve safety by detecting fires and

384 other emergencies quickly and reliably and alert authorities

385 sooner.

386   In vehicles, the sensors can detect a crash and

387 automatically alert emergency responders about the vehicle's

388 location and the number of occupants. Some of these systems

389   can even predict the injuries that might have resulted.

390   The availability of this real-time data is crucial in an

391   emergency since the faster response time can mean the

392   difference between life and death.

393   The Internet of Things is transforming industries like

394   manufacturing as well. Using low-cost sensors in automation,

395   factories can automatically turn off the lights and air-

396   conditioning when the workers leave, shut off valves if

397   sensors detect leaks, and shut down dangerous equipment if

398   sensors detect a malfunction. Innovative manufacturers can

399   use the data collected on the factory floor to gain insights

400   about the physical fabrication process, thereby improving

401   efficiency, increasing yields, and reducing product defects.

402   Manufacturers can also use sensors to collect real-time

403   data such as temperature and moisture about their shipments

404   to help ensure quality and optimize logistics. More

405   information can mean the difference between a recall and a

406   successful shipment.

407   As you can see, a significant amount of the data

408   collected by the Internet of Things will not involve

409   information about individuals but instead will be about the

410   environment, factories, vehicles, infrastructure, and other

411   electronic devices. And when data is collected about people,

412   much of it will be de-identified and aggregated. But when it

413   comes to personal privacy, Congress should tread lightly so

414   as to avoid impeding innovation. In particular, Congress

415   should recognize the privacy principles designed for a small-

416   data world do not work in a big-data world. Proposals such

417   as data minimization are based on the mistaken belief that it

418   is always possible to predetermine what information is useful

419   in the early stage and collect only that minimum amount.

420   Many of the benefits from data come from exploratory analysis

421   that finds new trends, relationships, and insights that were

422   not obvious at the outset. Restricting data collection could

423   severely curtail the many potential benefits of the Internet

424   of Things.

425   As more devices are connected to the Internet, it will

426   be more important than ever that they incorporate strong

427   security features. While the private sector is moving in the

428   right direction, Congress should further incentivize

429   companies to adopt strong security practices by adopting

430   policies that decrease the cost of strong security and

431   increase the cost of weak security. For example, Congress

432   should pass data breach notification legislation that

433 preempts state laws and reduces the legal compliance costs

434 companies face from abiding by multiple rules. This will

435 allow them to focus more resources on improving the security

436 of their products.

437   Congress should also pass cybersecurity information

438 sharing legislation to help organizations respond to real-

439 time threats.

440   Finally, Congress should encourage universities to

441 integrate cybersecurity training and to technical degrees so

442 that the next generation of coders and engineers build strong

443 security into their products. By improving education,

444 Congress can help raise the bar for security across the

445 entire U.S. tech sector.

446   The success of the Internet of Things will depend in

447 part on the actions of Congress. Just as the United States

448 needed a national broadband strategy, it also needs a

449 national strategy for the Internet of Things. Not only

450 should Congress avoid policies that would impose costs, limit

451 innovation, and slowed adoption, they should actively support

452 accelerating the development and deployment of the Internet

453 of Things, such as by creating pilot projects for smart

454 cities, encouraging smart infrastructure projects, and

455 designing an efficient regulatory review process for wearable

456 health technologies.

457   The Internet of Things has the potential to positively

458 impact virtually every industry from agriculture to

459 healthcare, and the Federal Government should be an active

460 partner in ensuring its success.

461   Thank you for the opportunity to speak with you today.

462 I look forward to your questions.

463   [The prepared statement of Mr. Castro follows:]

464 *************** INSERT 1 ***************

|

465   Mr. {Burgess.} The chair thanks the gentleman. The

466   gentleman yields back. Mr. Van Harlingen, you are recognized

467   for 5 minutes for the purpose of an opening statement,

468   please.

|

469   ^STATEMENT OF BRIAN VAN HARLINGEN

470   }   Mr. {Van Harlingen.} Thank you, and good morning,

471   Chairman Burgess, Ranking Member Schakowsky, and members of

472   the Committee. Thank you for holding this important hearing

473   on the Internet of Things, otherwise known as IoT. My name

474   is Brian Van Harlingen, and I am the Chief Technology Officer

475   at Belkin International.

476   Belkin is the maker of the WeMo home automation brand,

477   which allows users to remotely measure, monitor, and manage

478   their homes via a software suite including applications,

479   cloud infrastructure, and a portfolio of more than 25

480   connected devices. Surpassing 1 million activations, the

481   WeMo ecosystem ranges from switches to lighting to home

482   appliances.

483   After years of talk, the Internet of Things has arrived,

484   and the pace of innovation is accelerating at a phenomenal

485   speed. We are pleased that Congress and other policy makers

486   have joined the conversation, as policy awareness and

487   leadership will help to maximize the benefits of this

488   technological revolution and ensure consumer confidence. IoT

489 will drive economic growth, create jobs, and facilitate

490 entrepreneurship in completely new markets.

491   In my testimony, I will discuss three key topics:

492 consumer benefits, technological considerations, and privacy

493 and security.

494   First, consumer benefits. WeMo has been designed as the

495 most approachable entry point into the smart home.

496 Affordable and easy to use, WeMo provides bite-sized

497 solutions to make consumers' lives easier, simpler, and

498 better. WeMo's new Echo technology uses the home's existing

499 infrastructure to monitor, measure, and manage water,

500 electricity, and natural gas usage. Using advanced data

501 science and machine learning, these technologies have

502 enormous potential to save both money and resources.

503   As a connected solution, WeMo gains insight into how

504 consumers use WeMo devices in order to provide better

505 experiences and design future products. For example, through

506 data analytics, we learned that consumers were finding ways

507 to turn on their devices at sunrise and sunset, so we built

508 that functionality directly into our WeMo app. We also

509 learned that most WeMo Switch users were using them for

510 lighting purposes. So we developed and marketed the WeMo

511   Light Switch as our next product. These are examples of how

512   we use the data from the WeMo cloud to drive better

513   experiences for our consumers.

514   Second, technological considerations. IoT for the home

515   and business cannot exist without two primary technologies:

516   Wi-Fi and smart devices. As the maker of both WeMo and

517   Linksys Wi-Fi routers, Belkin understands both markets. Wi-

518   Fi has been widely adopted with a 61 percent penetration rate

519   in U.S. homes. WeMo products use familiar Wi-Fi technology.

520   They do not rely on hubs for connectivity or intelligence.

521   WeMo can integrate directly into partner products and serve

522   as an on-ramp to the Internet of Things for everyday products

523   like Crock-Pot slow cookers, Mr. Coffee coffeemakers, and

524   Osram Sylvania light bulbs.

525   From a policy perspective, the government and Congress

526   can help promote and grow the Internet of Things by making

527   sure these devices can talk to each other. Wireless

528   spectrum, already an important technology policy issue,

529   becomes even more important as IoT adoption accelerates and

530   billions of new devices come on line. Congress and the FCC

531   should continue to free up new spectrum, particularly on an

532   unlicensed basis. Failure to expand spectrum will stifle IoT

533   innovation and growth.

534   Last but not least, privacy and security. At WeMo, we

535   believe the nascent IoT market will benefits when consumers

536   know privacy and security are our top priorities. We believe

537   the Federal Government can take a light-touch regulatory

538   approach and work with the industry to ensure consumer

539   confidence.

540   We applaud this committee's efforts to pass data breach

541   legislation that would address the patchwork of state data

542   breach laws. WeMo has a very transparent data policy and

543   strictly controls all PII. The data collected from WeMo

544   devices is aggregated and anonymized. Non-personal

545   information is used to identify trends, to improve network

546   performance, and to provide additional benefits to consumers.

547   We understand the importance of data security and employ a

548   combination of industry-led security standards, procedures,

549   and organizational measures.

550   We have safeguards in place to prevent security breaches

551   and work closely with outside security researchers to

552   identify and address potential security vulnerabilities. We

553   support the latest security applications and continuously

554   improve and push consumer device firmware and application

555   updates. Security will always be a top priority, and as the

556   technology evolves, so will our efforts to provide safe and

557   secure products for consumers.

558   In conclusion, at WeMo, we are focused on delivering the

559   most user-friendly, innovative, and secure products. I

560   appreciate the opportunity to testify today and to share our

561   vision of the Internet of Things and answer any questions the

562   committee might have.

563   [The prepared statement of Mr. Van Harlingen follows:]

564   *************** INSERT 2 ***************

|

565   Mr. {Burgess.} The chair thanks the gentleman. The

566 chair now recognizes Ms. Schooler 5 minutes for the purpose

567 of an opening statement, please.

|

568 ^STATEMENT OF ROSE SCHOOLER

569 }   Ms. {Schooler.} Good morning, Chairman Burgess, Ranking

570 Member Schakowsky, and members of the subcommittee. Thank

571 you for the opportunity to provide testimony on the

572 importance of the United States' establishing a global

573 leadership role in the Internet of Things or the IoT.

574   As head of Intel's IoT's Strategy and Technology Office,

575 own the IoT strategy for the company. Intel's 30 years of

576 investment, innovations, and standards leadership in the

577 evolution of computing provide the foundational elements of

578 the strategy. Intel believes the IoT presents a

579 transformational opportunity for the United States and for

580 the world. It will enable innovation, increase productivity,

581 and deliver efficiencies across the public and private

582 sector. While some think of the IoT as smart thermostats and

583 wearables, these consumer devices are only a few of the many

584 applications. The primary economic driver will be non-

585 consumer areas such as industrial and commercial

586 applications. I will address three topics that are important

587 to consider as you chart your policy. One: Why is the IoT

588   important? Two: What are the barriers to a successful IoT

589   ecosystem? And three: How can policymakers accelerate

590   deployments to ensure U.S. leadership?

591   First: Why is the IoT important? It will drive

592   unprecedented benefits for government, businesses, consumers,

593   and communities. It is estimated that 50 billion devices

594   will connect to the Internet by 2020 generating 44 zettabytes

595   of data. Consider that in 2009, the World Wide Web was

596   estimated at just a half a zettabyte. The IoT presents the

597   opportunity to connect these devices, efficiently analyze the

598   data, and use the information to improve our decision-making.

599   In doing so, the IoT is expected to have a multi-trillion

600   dollar global economic impact. What should most excite U.S.

601   policymakers is that America and other developed economies

602   are expected to capture 20 percent of this impact if we lead.

603   Let us consider one IoT application. Saia Trucking is

604   located in Georgia and has a nationwide fleet of 3,000

605   trucks. They recently deployed an Intel-based IT solution

606   which alters routes and guides drivers' performance real-

607   time. Saia increased fuel efficiency by 6 percent

608   translating into $15 million of annual savings. The U.S.

609   trucking industry consumes 54 billion gallons of fuel per

610 year. Extrapolating that success, our Nation could save over

611 3 billion gallons of fuel yearly while reducing our CO2

612 emissions.

613   What are potential barriers to a successful IoT

614 ecosystem? One barrier as noted could be security. It is

615 not implemented from the outset. For this reason, Intel

616 prioritizes security as the foundational element of our IoT

617 strategy. We will integrate security at the outset building

618 cryptography into our chips to enable strong identity and

619 data protection. In addition to the compute device itself,

620 our solutions will employ advanced software security to

621 prevent harmful applications from being activated on the

622 device or taking down the network. Integrating multiple

623 layers of security at the outset enables trusted data

624 transmission necessary for successful IoT deployments.

625   Other potential barriers include connecting to legacy

626 infrastructure, interoperability between devices, and

627 developing global standards. To address these barriers,

628 Intel collaborated with industry leaders to define five

629 tenants of successful IoT solutions. They are security, ease

630 of connectivity, interoperability, data analytics, and ease

631 of deploying new applications and services. Based on these

632   tenants, we recently launched the Intel IoT platform.

633   Finally, how can policymakers accelerate IoT deployments

634   to ensure U.S. leadership? Candidly, the United States is

635   behind. Other countries are aggressively investing and

636   deploying IoT implementations to transform their economies,

637   address societal problems, and spur innovation. China,

638   Brazil, Germany have all adopted national IoT plans with

639   time-bound goals and are investing heavily in IoT R&D and

640   infrastructure. The United States must leverage our vast

641   resources and capabilities, promoting industry alignment

642   around these large-scale IoT deployments based on secure,

643   open, and interoperable solutions will showcase U.S.

644   leadership.

645   Congress can advance our Nation's IoT momentum by

646   collaborating with industry to establish a national IoT

647   strategy, encourage public/private partnerships, and invest

648   in IoT research. Intel is confidence that the United States

649   can lead the IoT transformation with a continued open

650   dialogue as you are doing here today and by implementing some

651   of these recommendations.

652   Thank you for your time, and I look forward to your

653   questions.

654   [The prepared statement of Ms. Schooler follows:]

655   *************** INSERT 3 ***************

|

656   Mr. {Burgess.} Thank you. The chair recognizes Mr.

657   Morehead for 5 minutes for the purpose of an opening

658   statement, please.

|

659   ^STATEMENT OF BRAD MOREHEAD

660   }   Mr. {Morehead.} Thank you, Chairman Burgess, Ranking

661   Member Schakowsky, and members of the committee. We use the

662   IoT every day when we check traffic or look at the weather

663   forecast. We also see it in the wide variety of smart

664   devices that are popping up everywhere, like smart

665   refrigerators, smart coffee makers, or smart watches. But

666   rather than talking about smart coffeemakers and

667   refrigerators, I would prefer to illustrate the potential

668   benefits of a robust Internet of Things by sharing a brief

669   story about how the security alarm industry works.

670   Imagine an emergency at your home or at your school or

671   at your work, a burglary or violent crime in progress with

672   multiple potential victims on the scene where the intruder or

673   the victim has triggered an alarm. Speed and information are

674   critically important to the first responders. However, when

675   that security alarm goes off at that home, business, or

676   public location, that signal is delayed for over a minute to

677   reduce false alarms. Furthermore, the process of notifying

678   the alarm monitoring center is surprisingly manual, as the

679 alarm is transmitted after the delay to a person in the alarm

680 center who must then be connected to another person at a 911

681 public safety answering point, or PSAP, for emergency

682 dispatch.

683   After an average 1- to 3-minute phone conversation

684 between that security station and the PSAP safety agency,

685 emergency responders are contacted and dispatched to the site

686 of the alarm--again, where time is of the essence. But the

687 first responders are given nothing more than basic

688 information about the type of alarm and location of the

689 incident. This average dispatch total can take 5 to 10

690 minutes, and that is valuable time and information that is

691 lost in a true emergency. By some estimates from the DOJ,

692 each year more than 1 million police hours are wasted due to

693 these human errors and communication issues in this

694 transmission process.

695   Adding to that frustration is the fact that there may be

696 additional security cameras, motion sensors, door sensors, or

697 other sensors at the site of the emergency capturing valuable

698 information. Unfortunately, in most cases, those additional

699 sensors and cameras have no way of communicating to the

700 monitoring station, 911 PSAP, or the first responders.

701   In other words, there is potential lifesaving data

702   available that no one sees. This can cause first responders

703   to arrive at the wrong place at the wrong time and without

704   important information to save lives.

705   With the IoT, these processes could be seamlessly

706   automated and integrated to prevent and mitigate crimes in a

707   more efficient way. In the future, the transmission of

708   emergency alarms and sensor data could occur instantly from

709   machine to machine, or M-2-M, instead of manually. Automated

710   applications could be used to gather and interpret the alarm

711   information from various IoT devices to determine the

712   probability of a false alarm or help first responders use

713   their time more efficiently and arrive at the right place.

714   Smart sensors and cameras could be used to automatically

715   transmit images and data from the scene of the crime directly

716   to the officers.

717   Using IoT, two companies and centers were able to cut

718   alarm transmission times down to 5 seconds and reduce the

719   volume of calls going between these centers by 10 percent.

720   Now imagine if that was implemented nationwide, how much more

721   productive our police, fire, and EMT responders could be with

722   fewer false alarms and better, faster information from IoT

723   connected systems and devices. Internet of Things can help

724   deliver first responders to the scene faster, more

725   efficiently and with more information on the current

726   emergency, if we invest now in the IoT infrastructure that we

727   need so that we go beyond smart coffeemakers and

728   refrigerators.

729   Unfortunately, there are still a few technological

730   barriers that are preventing us from implementing an ideal

731   system. The IoT consists of a few key components: a power

732   source, a communication protocol and data processing.

733   Let us begin with power, since this is a subcommittee of

734   the Energy and Commerce Committee. These connected sensors

735   in the Internet of Things must have a power source, and while

736   wired is preferred in some cases, it is typically too

737   expensive to implement. Therefore battery power offers the

738   widest array of uses, but the currently short battery life

739   must be improved to lower the cost of ongoing maintenance and

740   fully tap the potential of IoT.

741   As an example of this, recently a tech startup called

742   Quirky developed a smart egg holder that would tell you when

743   you were out of eggs in your refrigerator. This sounds like

744   an interesting and useful, but due to current battery

745 technology, it unfortunately it needed its batteries replaced

746 more often than it ran out of eggs to replace. So when lives

747 are on the line instead of omelets, we need to make sure that

748 these smart devices don't lose power. This will require

749 investment in more powerful batteries with longer lifespans.

750   Secondly, we need to insure the availability of open

751 wireless spectrum for IoT and specifically IoT for public

752 safety agencies. A government program called FirstNet is

753 developing new wireless applications to aid first responders

754 instead of existing radio-dispatch technology first used in

755 the 1960s. We need more funding for projects that involve

756 improving our Nation's infrastructure for wireless

757 integration and emergency dispatch.

758   As an example of our outdated emergency infrastructure,

759 currently only about 200 out of 5,900 911 PSAP centers can

760 handle text messages. Text messaging has been around for 20

761 years, but approximately 3 percent of 911 centers can receive

762 texts. And when you consider that 96 percent of young people

763 text regularly but only 67 percent make phone calls

764 regularly, you can see how much emergency information we may

765 be missing.

766   Also in our way looms the threat of multiple connection

767   standards for smart devices. Computers generally connect to

768   the Internet using one of two methods, Ethernet or Wi-Fi.

769   However, smart devices connect using a plethora of standards

770   including Wi-Fi, Bluetooth, Ethernet, z-wave, ZigBee, and

771   Thread, in addition to numerous proprietary protocols. So

772   currently a Nest thermostat may know the temperature in a

773   home is increasing due to a fire but it is unable to contact

774   the 911 PSAP through the security system if the homeowner is

775   asleep or unavailable. IoT standards and interconnectivity

776   would solve this.

777   As an example, my company, LiveWatch Security, developed

778   As Soon As Possible Emergency Response, or ASAPer, which is

779   an application that is a step in that direction. It combines

780   the speed of machine-to-machine communication with the latest

781   group chat communication technology to allow people to

782   process this information from the IoT and sensors. This IoT-

783   enabled system has reduced false alarms by up to 30 percent

784   while also improving response times, in some cases, by 80

785   percent. We must continue to invest in the entrepreneurs

786   that will develop these new applications and improve the way

787   we process data from the IoT to turn it into useful

788   information for our first responders.

789   These are all issues that can be solved with additional

790   smart investment in the smart things that make up the

791   Internet of Things. We can obtain the most progress towards

792   eliminating these obstacles by focusing on engineering

793   advances in battery efficacy and low-power radio range,

794   finding better ways to utilize wireless spectrum for first

795   responders and creating standards for communication between

796   the IoT ecosystems, and finally, investing in better first-

797   responder infrastructure that can handle new types of

798   communication to, and from, IoT devices and users.

799   We are at the beginning of the next big shift in

800   technology where machines and devices can talk to each other

801   and instantly share data in ways that change lives.

802   We can use IoT to enhance the security of Americans and

803   the safety of our first responders. To me, these are

804   compelling reasons to invest in this new frontier of

805   technology. Thank you.

806   [The prepared statement of Mr. Morehead follows:]

807   *************** INSERT 4 ***************

|

808   Mr. {Burgess.} The chair thanks the gentleman for his

809 remarks. We will now move into the question-and-answer

810 portion of the hearing. I will begin by recognizing myself 5

811 minutes for the purpose of questions.

812   I want to ask a couple of general questions just on the

813 general theme of the governance of the Internet of Things,

814 and I would like to ask each panelist to respond briefly in

815 turn. And Mr. Castro, we will start with you. It is an

816 open-ended question, and I will acknowledge that. And many

817 of you have already addressed this partially in your

818 testimony, but what do you see is the appropriate role of

819 Congress right now relative to the Internet of Things,

820 bearing in mind we are marking up data breach notification

821 tomorrow and probably before the spring is over, we will have

822 a mark-up on patent demand letters. But irrespective of

823 that, I welcome your thoughts.

824   Mr. {Castro.} Sure. Absolutely. I think the number

825 one issue right now, just because it is growing in attention,

826 is data breach. We saw, you know, so many data breaches over

827 the past year, high profile. This is something that

828 Americans are worried about, and it is something where I

829   think Congress could take an immediate and important step.

830   But long-term, as I think you have heard from at least two

831   panelists up here, we are really thinking about national

832   strategy for the Internet of Things. This is something that

833   Congress can get behind, that the Federal Government can get

834   behind, and you really create a new vision for the future of

835   commerce, the future of houses that interact with technology

836   and how we can have an impact in so many different areas.

837   Mr. {Burgess.} Thank you. Mr. Van Harlingen?

838   Mr. {Van Harlingen.} As has been mentioned, I think

839   data breach management and rules around that and consistency

840   around that nationwide would be very helpful to both the

841   industry and consumers.

842   As I mentioned in my opening statement, I think spectrum

843   management, both for the unlicensed spectrum and as Mr.

844   Morehead mentioned, for emergency first responders in a more

845   licensed fashion would be very good investments of time for

846   the committee and for the Federal Government.

847   I would advocate a light-touch approach. This is a very

848   new and emerging space where we have a lot to learn about

849   what is possible and what value we can create.

850   Mr. {Burgess.} Thank you. Ms. Schooler, your thoughts

47

851   on the appropriate role of Congress.

852   Ms. {Schooler.} Yeah, absolutely. I think it is

853   starting today, an open dialogue between industry and

854   government, consumer groups to get the needs and the

855   interests of the consumers on the table as we chart policy

856   moving forward as well as people from industry environments.

857   I think we need, as I mentioned in my statement, to

858   encourage a focus on security and interoperability. I think

859   the opportunity to leverage public and private partnerships

860   will be key, and I think even if you look at the

861   infrastructure and the capabilities within transportation's

862     $351 billion opportunity in that segment over I think it is

863   650,000 fleets and tires and trucks within the Postal Service

864   in the U.S. Government, excellent opportunity to try out some

865   of this technology with public and private partnerships.

866   We talked about a national IoT strategy. I think that

867   is critical moving forward. And again, open standards, open

868   architecture, open source, interoperability, allow for the

869   continuation of innovation.

870   Mr. {Burgess.} Very good. Mr. Morehead?

871   Mr. {Morehead.} I agree on the points about open

872   standards and interconnectivity. For most of the sensors, I

873   think that investment in battery power and improved

874   performance for batteries will be incredibly important as we

875   develop new sensors. But finally I do think investing in the

876   infrastructure of our Nation's PSAPs and emergency first

877   responders is incredibly important.

878   There was an article in the Journal recently about a

879   company called Smart Things, and the journal reviewed the

880   technology of smart things. And at the end of the article,

881   what they found is that the most compelling use of the

882   technology was turning on the coffeemaker in the morning,

883   which frankly wasn't compelling, was the summary of the

884   article.

885   When you talk about investing the types of time and

886   money that you would be investing, I think you could look to

887   the Nation's infrastructure and truly save lives which has an

888   immeasurable benefit of both the first responders and

889   potential victims by investing in the public infrastructure

890   and the PSAPs to get the right information distributed to

891   emergency first responders faster. And that has a higher--a

892   faster payback than potentially some other projects.

893   Mr. {Burgess.} Great. I thank all the panelists for

894   their thoughts on that. Just being mindful that I want to

895   stay within the constraints of 5 minutes because I am going

896   to insist that everyone else do that on the dais, Mr.

897   Morehead, you referenced the fact that, well, the Journal

898   article about the coffeemaker, well, that is really not that

899   important. But what some days seems trivial to one person

900   may down the road actually be very significant, and I guess

901   the overarching theme here is a regulatory touch. You heard

902   Ms. Blackburn mention it, the light regulatory touch. Could

903   each of you speak in one word or two words to the regulatory

904   touch that you would like to see on the side of the agencies?

905   Mr. {Castro.} I think we want to embrace innovation and

906   let, you know, let these companies--you saw the showcases out

907   there today. Imagine what it will look like 10 years from

908   now. You want to see that innovation flourish.

909   Mr. {Burgess.} Mr. Van Harlingen?

910   Mr. {Van Harlingen.} Agreed, a light touch that fosters

911   innovation and creativity and exploration in this space.

912   Mr. {Burgess.} Great. Ms. Schooler?

913   Ms. {Schooler.} Light touch to spur innovation.

914   Mr. {Morehead.} The coffee from the smart coffeemaker

915   is good dark, but regulatory touch I think would be better

916   light.

917   Mr. {Burgess.} Very good. You have all allowed me to

918   fit within the constrains. I will now recognize the Ranking

919   Member of the Subcommittee Ms. Schakowsky 5 minutes for

920   questions, please.

921   Ms. {Schakowsky.} Thank you very much for all your

922   testimony. I wanted to give a little bit of opportunity to

923   Mr. Morehead to tell us a little bit more about LiveWatch.

924   Mr. Morehead, home security systems have been in existence

925   long before 2002 when LiveWatch was created. So as we

926   increase our technologies, et cetera, what motivated you and

927   your business partners to enter this space? And how do you

928   think that what you are doing improves consumer experience?

929   Mr. {Morehead.} Thank you, Ranking Member Schakowsky.

930   When we entered the space, we saw an opportunity with a

931   business model in the home security industry that was

932   relatively unchanged for decades, predominantly ADT where

933   customers were paying significant amounts of money and not

934   getting the value that they needed. And we saw an

935   opportunity to bring a technology focus, a disruptive

936   technology focus to a relatively nascent industry.

937   And the nice thing about home security is it is formed

938   upon a foundation of security, right? We talk about security

939 and privacy here, home security is by definition focused on

940 security. So we use that as a foundation to disrupt the

941 business by going direct to consumers and lower their prices

942 by about 30 to 50 percent, by eliminating the middlemen of

943 sales and delivery and having customers self-install their

944 wireless systems.

945   So all of our infrastructure is wireless. It is formed

946 on a basis of security, and then from that point, we added

947 layers of additional technology, received multiple patents

948 for that to determine how customers could use the information

949 that was flowing from those systems. Specifically the

950 opportunity we saw there is a home security system was really

951 Internet of Things before there was an Internet of Things.

952 We have sensors in homes and businesses throughout the

953 country, throughout the world. Those produce data. That

954 data is then transmitted to a central station where it looks

955 for alarms.

956   But the fact of the matter is, we can do additional

957 things with that information, and that is where we have taken

958 the next step with our product, ASAPer, to allow customers to

959 process the information, the data coming from those devices,

960 in a more effective way.

961   Ms. {Schakowsky.} Are you concerned at all? Because a

962   number of people will be contacted that there is some sort of

963   breach of security in the home, right? How do you protect

964   against unwanted invasions of that information that is

965   circulated to a certain population of people, family members

966   for example?

967   Mr. {Morehead.} The main thing that we try to do is we

968   limit the information to the people that the homeowner or the

969   business owner specifically selects to receive that

970   information. So we keep it in a tight-knit group that is

971   selected by that person to receive the information.

972   The challenge is that there is power in numbers, and so

973   we want to get the information to as many people as we can in

974   an emergency because we are looking for the one person that

975   knows what is actually happening and that can help resolve

976   it.

977   So we need to get it ideally just to the one person that

978   knows, but to do that we have to get the information to

979   multiple people. So we allow the homeowner to put those

980   people on the list, and then we bring them into a group chat

981   to help facilitate the resolution of that alarm signal. And

982   we found that thus far, implementing the right technology and

983   security on the back end, it has been a productive way to do

984   it. And instead of having two to three fixed members on an

985   alarm distribution list, we have tested it with up to in a

986   school setting, up to 170 people simultaneously on one group

987   chat to see what would happen if there was an emergency at a

988   school and there is no other system that can facilitate that

989   communication.

990   Ms. {Schakowsky.} Have you seen any particular problems

991   that result from having a universe as large as 170?

992   Mr. {Morehead.} At this point we have not. Overall it

993   has been pretty positive. I think that there is some

994   learning curve for consumers and users as they get up to

995   speed and say, oh, I am chatting and trying to have a

996   conversation with 170 other people. But in the end, what you

997   tend to find is that only one or two people actually step up

998   in that conversation because they are the ones with the

999   relevant information. So of that 170, we are really just

1000   looking for the one or two people that can help resolve the

1001   situation.

1002   Ms. {Schakowsky.} Thank you. Mr. Castro, you said

1003   something interesting at the end of your written testimony

1004   about education and building cybersecurity education. I am

This is a preliminary, unedited transcript. The statements within may be inaccurate, incomplete, or misattributed to the speaker. A link to the final, official transcript will be posted on the Committee's website as soon as it is available.

1005   going to read it. Congress should encourage universities to

1006   integrate cybersecurity training into technical degrees so

1007   that the next generation of coders, engineers, build strong

1008   security into products at the outset.

1009   Do we not do that now as we are training people?

1010   Mr. {Castro.} Yeah, it is a great question. I mean,

1011   the field of information security has evolved over time. So

1012   originally many of the problems that we saw in computer

1013   systems were because the coders weren't thinking about the

1014   security issues, and you had people fixing that afterwards.

1015   As we are moving into the Internet of Things, we want people

1016   to be thinking about the big issues that exist today and how

1017   they can fix them at the outset rather than doing it later

1018   on.

1019   Ms. {Schakowsky.} Thank you. I think universities and

1020   educational systems have a role, too, to play, and I thank

1021   you for pointing that out.

1022   Mr. {Burgess.} The chair thanks the gentlelady. The

1023   gentlelady yields back. The chair recognizes the gentlelady

1024   from Tennessee 5 minutes for questions, please.

1025   Mrs. {Blackburn.} Thank you, Mr. Chairman, and I have

1026   got three questions, and I want to hear from each of you on

55

1027   them. So I appreciate brevity. And if you want to expand to

1028   anything further, please do it in writing within the next

1029   week or so.

1030   First of all, let us talk about privacy because that is

1031   always top of mind. What is this going to do to me if I use

1032   this thing? And when you talk about big data and the

1033   explosion of data that is out there, first of all, let us

1034   look at it like this. What do you think the trend is for

1035   growth of data on the Internet? Are we going to continue to

1036   see this explosion? And secondly, what should Congress' role

1037   be in protecting that data? And let us just start. Very

1038   quickly, Mr. Castro, I am going to start with you. Let us

1039   work down so we can move to question two.

1040   Mr. {Castro.} Sure. So in terms of the trend, it is

1041   increasing.

1042   Mrs. {Blackburn.} Okay.

1043   Mr. {Castro.} Do you want me to address the second

1044   part?

1045   Mrs. {Blackburn.} Sure.

1046   Mr. {Castro.} Yeah, and so the second part about this

1047   is, you know, Congress should be really looking at how

1048   consumers are hurt or not hurt by the use of the data.

1049   Mrs. {Blackburn.} So define harm?

1050   Mr. {Castro.} Define harm and not regulate the

1051 collection. We want data to be collected and shared.

1052   Mrs. {Blackburn.} Okay. Yes, sir?

1053   Mr. {Van Harlingen.} So I agree the trend is huge. The

1054 amount of data that we have is directly proportional to the

1055 value we can create, and I think the way to deal with it as

1056 in the FTC's recommendations is pay very attention to

1057 providing notice and choice to the consumers.

1058   Mrs. {Blackburn.} Okay.

1059   Ms. {Schooler.} I saw data recently where 90 percent of

1060 the data today was created in the last two years.

1061   Mrs. {Blackburn.} That is right.

1062   Ms. {Schooler.} I think that is indicative of the pace

1063 of innovation and the creation of data, and I think whatever

1064 we say in terms of data growth, we will be grossly wrong.

1065   Mrs. {Blackburn.} Okay.

1066   Ms. {Schooler.} We will under-call it. What do we need

1067 to do from a policy perspective? Again, I think we need to

1068 bring multiple parties to the table. I think we need to

1069 bring the government, industry, consumer groups to understand

1070 what some of the use cases are and create policy around use

1071   case versus a broad, blanket policy to try to manage every

1072   scenario. And two, I think we need to build security in from

1073   the onset as I mentioned in my testimony from the device to

1074   the network to the cloud.

1075   Mrs. {Blackburn.} Okay.

1076   Ms. {Schooler.} And when we often say we want to create

1077   redundancy in that transmission, it means you don't always

1078   secure it at one point. You secure it throughout the

1079   transmission and the manipulation of the data. So those are

1080   my two comments.

1081   Mrs. {Blackburn.} Okay. Mr. Morehead?

1082   Mr. {Morehead.} I think there will obviously be

1083   substantial growth in the data. I think you will see

1084   multiple models emerge because this is not a winner-take-all

1085   market, and for lack of better terms, I will call it an Apple

1086   model and a Google model, an Apple model where the data is

1087   more private and a Google model where the data is used

1088   publically. The customer, the consumer, may get less

1089   expensive hardware, less expensive or free services, but the

1090   data will be used to provide other options. So I think

1091   multiple models will emerge for the data.

1092   Mrs. {Blackburn.} Okay. Second question, I want to

1093   look at education for consumers and some of the consent

1094   agreements that companies have when you are talking about the

1095   Internet of Things and the utilization of this data.

1096   Do you think that companies in these agreements for a

1097   particular service, did they adequately inform consumers and

1098   the consumers understand how this data is going to be

1099   utilized and what can be done to improve those privacy

1100   policies if you will so that consumers are offering true

1101   informed consent when they agree to utilization of some of

1102   the services that are there? And you know, one we discussed

1103   yesterday was insurance companies wanting you to utilize some

1104   type of component, and it gives you the number of hard breaks

1105   and fast stops and speeds driven, things of that nature. And

1106   we have got only 45 seconds left. So let me do this. I am

1107   going to -- I will ask for that response. I want to move

1108   onto the third question just to lay it out since we are going

1109   to run out of time, the economic impact. And Accenture had a

1110   great report on the economic impact of the Internet of

1111   Things. And I would like to get your take on that statement.

1112   We have it for you. And I want to know if you agree with it,

1113   and then I would like for you to speak specifically when you

1114   respond in writing to the challenges that exist in the United

1115   States to realizing this type of economic growth. What are

1116   the barriers to entry? What are the hurdles that are going

1117   to be there? What are we doing wrong from a regulatory side

1118   that are disenfranchising innovators? And I yield back my

1119   time.

1120   Mr. {Burgess.} The chair thanks the gentlelady. The

1121   gentlelady yields back, and those responses will be

1122   anticipated as written responses. Mr. Cardenas of

1123   California, you are recognized for 5 minutes for questions,

1124   please.

1125   Mr. {Cardenas.} Thank you, Mr. Chairman. The first

1126   question that I have is to Ms. Schooler. The City of Los

1127   Angeles is still a pretty big economic juggernaut for

1128   manufacturing in this country. When it comes to the Internet

1129   of Things and that type of innovation, what do we anticipate

1130   for manufacturing and production of products, et cetera, and

1131   the streamlining? And what is in the back of my mind is

1132   jobs, the opportunity to have successful businesses and

1133   therefore, a good, robust economy. So what can we expect

1134   going forward? Is this something that is going to be

1135   utilized more and more when it comes to manufacturing or

1136   something that we plateaued on where are we at, do you think?

1137   Ms. {Schooler.} Excellent question. We very much

1138   believe manufacturing will be smart manufacturing, in

1139   particular will be an excellent opportunity for the Internet

1140   of Things. At Intel we actually deployed a smart

1141   manufacturing pilot within one of our manufacturing

1142   facilities, and as you know, we make millions of things every

1143   year. So I think we are a pretty good test case. In that

1144   implementation we found that we collected data that allowed

1145   us to do predictive maintenance, and with predictive

1146   maintenance you increase up-time, you improve yields. And in

1147   that pilot, we realized a $9 million return on that single

1148   opportunity for that pilot in that single factory.

1149   Accenture published a report recently that they said 87

1150   percent of the CEOs in the country see a long-term job growth

1151   opportunity, and I think to put that into practical terms, if

1152   you think about lowering the cost of goods sold, that is a

1153   great way to attract jobs back to the United States. So

1154   number one, let us optimize our manufacturing facilities from

1155   a product-cost perspective, use the technology to use

1156   predictive maintenance as a capability to increase up-times,

1157   again bringing down the total cost of goods, and to improve

1158   the utilization and the effective utilization rates of the

61

1159   equipment, again, improving output.

1160   So I think all of these things will result in job

1161   creation and bringing jobs back on shore.

1162   Mr. {Cardenas.} Thank you. And I like your example

1163   that you gave, and it reminds me that efficiency is a win,

1164   win, win, win, win, not only for the manufacturer but also

1165   for the consumer and for the community.

1166   Which leads me to my next question. Brian, if you could

1167   please. Hopefully it is a great answer for Los Angeles.

1168   California is going through a drought. We have yet to see

1169   the worst of it. So what do you see in the consumer space or

1170   even in the industrial space when it comes to efficiency,

1171   opportunities for energy, water, things of that nature with

1172   this technology?

1173   Mr. {Morehead.} So one of the technologies that we are

1174   working on in particular is a technology that we call Echo

1175   that allows the consumer's home or a business to monitor

1176   their energy use, their water use, in great detail through a

1177   single point using the existing infrastructure in the home.

1178   It is a very cost-competitive technology or cost-effective

1179   technology. We think we will educate people about how water

1180   and power are being used in their house and lead to improved

1181   behavior around that consumption.

1182   Mr. {Cardenas.} So you see a lot of advancements there

1183   and a lot more usage?

1184   Mr. {Morehead.} Absolutely. It is a place that we are

1185   putting a lot of our research efforts.

1186   Mr. {Cardenas.} Yeah. Hopefully it is a lot more

1187   efficient than pounding on the door when I tell my kids they

1188   have to take shorter showers.

1189   Mr. {Morehead.} Agreed. It is also very good at

1190   detecting leaks which are a huge source of water waste in the

1191   city.

1192   Mr. {Cardenas.} Absolutely. Well, thank you. And the

1193   last question to whoever would like to help enlighten us,

1194   what can we learn from the rest of the world? We are very

1195   spoiled in this country. We are still the economic

1196   juggernaut of the planet. We are looked to by many places

1197   around the planet for leadership. But once in a while we see

1198   ourselves looking and jog our head back and go wow. They got

1199   it right over there. They did something really cool or they

1200   did something that is advanced or something that we probably

1201   should have thought of but we didn't. What examples can you

1202   enlighten us about what is going on maybe around the world

1203   that we could learn from and then take their leadership?

1204   Mr. {Castro.} Well, something--and following up on your

1205   question about the water, if you look at India, I mean, so

1206   many countries have these big economic and social problems.

1207   They don't have any alternative but to go to the best

1208   technology and really look for an innovative solution. So in

1209   India, you know, they have decaying water infrastructure.

1210   Using smart technology, they are able to actually you know,

1211   cut significant waste at less cost than it would have been to

1212   replace the infrastructure. So really the United States

1213   should be looking at the same thing. We have decaying

1214   infrastructure. We just have a lot more money. So how can

1215   we do it really efficiently?

1216   Mr. {Cardenas.} Thank you. Real quick?

1217   Ms. {Schooler.} I would be happy to go next. I think I

1218   noted in my testimony that we see national IoT plans in other

1219   countries, Germany, Brazil, China. I definitely think as we

1220   had a broadband plan, we should have an IoT strategy and plan

1221   for the country. I think that would help us accelerate our

1222   learnings and accelerate our deployments which is critical.

1223   And just interestingly enough, a little tidbit from the

1224   demo room, I was talking to the SteadyServ beer keg optimizer

1225   which I think is a fascinating IoT use case. And in that

1226   deployment, one of the things that he was discussing and we

1227   were talking about was the adoption between the United States

1228   and Europe. Well, in Europe, they are looking at the

1229   opportunity, looking at the return on the investment in

1230   adopting the technology much more aggressively. And in the

1231   United States, there is still some hesitancy because it is

1232   not how we are used to doing it. And I think collectively

1233   between government and industry, large business and small

1234   business, we have to start embracing technology in a much

1235   more aggressive fashion than we have in the past.

1236   Mr. {Cardenas.} Thank you, Mr. Chairman. I yield.

1237   Mr. {Burgess.} The chair thanks the gentleman. The

1238   gentleman yields back. The chair recognizes the gentleman

1239   from New Jersey, vice chairman of the committee, Mr. Lance,

1240   for 5 minutes for your questions, please.

1241   Mr. {Lance.} Thank you, Mr. Chairman. And good morning

1242   to the panel. I was very pleased to see Alcatel-Lucent, Bell

1243   Labs, and Qualcomm representing the district I serve at the

1244   showcase today, and I thought it was a wonderful showcase.

1245   And I commend the chairman for his hard work in making sure

1246   that it occurred.

1247   Bell Labs demonstrated truly remarkable 5G wireless

1248   technology that will enable a variety of Internet of Things

1249   applications such as high-quality videos, smart meters, and

1250   connected cars. One thing is clear. Spectrum is one of the

1251   engines that will drive the Internet of Things revolution.

1252   To the panel in its entirety, what would you suggest

1253   that Congress do to provide the spectrum resources needed to

1254   support next generation networks in the Internet of Things?

1255   Mr. Castro?

1256   Mr. {Castro.} Thank you. As we can see in these demos

1257   and just looking around the market, there are going to be a

1258   growing number of devices, a huge number of devices

1259   everywhere. So I think just in general, we are looking for

1260   commercial spectrum to be available, both licensed and

1261   unlicensed, and that is something that I think we are just

1262   going to have--Congress will have to continue to monitor and

1263   promote.

1264   Mr. {Lance.} Thank you.

1265   Mr. {Van Harlingen.} I agree. I think that there are

1266   requirements for both licensed and unlicensed spectrum for a

1267   variety of different applications. I would encourage

1268   Congress to collaborate in detail with the industry on what

1269   those needs are and provide that spectrum as available.

1270   Mr. {Lance.} Thank you.

1271   Ms. {Schooler.} I agree with the previous comments. I

1272   think we need to leverage both the licensed and unlicensed

1273   spectrum, utilize the technologies that exist today to get

1274   the economies of scale that will enable us to drive and

1275   growth and accelerate deployments. That in lieu of looking

1276   at a specific use case and a specific spectrum band for IoT,

1277   I think we should leverage what we have today.

1278   Mr. {Lance.} Thank you. Mr. Morehead?

1279   Mr. {Morehead.} As we look forward, it is important to

1280   understand where we are going with the spectrum. I think

1281   that there are some lessons we can learn from the past. One

1282   of the challenges for those of us that have been doing IoT

1283   for the last decade or so is backward compatibility and

1284   sunset of existing wireless connectivity, 2G, 2-1/2G and the

1285   sunset that is happening with the wireless providers there is

1286   creating a big issue for us where we already have Internet of

1287   Things systems in the field and we are having to replace

1288   those. It is a large expense.

1289   So as you think about moving forward what you want to do

1290   with the spectrum, I think it is important to consider

1291 backward compatibility and when and how those wireless

1292 systems sunset.

1293   Mr. {Lance.} Okay. Thank you very much to the entire

1294 panel. Mr. Castro, privacy oftentimes means different things

1295 to different people. Do you think the market is capable of

1296 addressing concerns related to privacy in the Internet of

1297 Things market over time?

1298   Mr. {Castro.} Yes. I think, you know, consistently

1299 what we see is when there is new technologies--and this goes

1300 back, you know, decades, centuries even--when new

1301 technologies come out, there are fears and doubt and

1302 uncertainty about the technology. But what we see is over

1303 time many of those issues are resolved just by the market,

1304 that you have this, you know, convergence between what

1305 business wants to do, what consumers want to have, and what

1306 government regulates. And a lot of these issues are worked

1307 out which is why in general I think we want this light touch

1308 approach. Especially it is important with the Internet of

1309 Things because so much of the innovation is around the data,

1310 and if you can't have companies sharing or reusing this data

1311 for lots of innovative purposes, this kind of long tail of

1312 innovation, you are not going to get this magnitude of

1313   benefits that we want to see.

1314   Mr. {Lance.} Thank you. Belkin has a close connection

1315   to consumers and access to very personal data. How has

1316   Belkin approached the privacy and security of consumer data

1317   in its product offerings?

1318   Mr. {Van Harlingen.} So Belkin takes privacy very

1319   seriously. Some of our products, you know, are very close to

1320   consumers, as you mentioned, including cameras and things

1321   like that. We work very closely on security, stay standard

1322   and ahead of the curve with industry standards. We have an

1323   application security team that is very active in the industry

1324   working with the Black Hat Community and other security

1325   researchers, and they are very thorough at reviewing our

1326   products, both before launch as well as after launch.

1327   Mr. {Lance.} Thank you. Mr. Chairman, I yield back 28

1328   seconds.

1329   Mr. {Burgess.} The chair thanks the gentleman. The

1330   gentleman does yield back. The chair recognizes the

1331   gentleman from Houston, Mr. Olson, 5 minutes for your

1332   questions, please.

1333   Mr. {Olson.} I thank the chair, and welcome to our

1334   witnesses. I want to follow up on my colleague's comments

1335   from California about manufacturing. As you all know, in the

1336   last decade, loss of good manufacturing jobs have left

1337   America and gone overseas. Many reasons, excessive taxes,

1338   excess regulations, but this appears to be the opportunity to

1339   bring things back to America with the IoT. So my question to

1340   you, Ms. Schooler, as one who has manufacturing as part of

1341   your business, you mentioned Germany, Brazil, and China.

1342   What are they doing that we are not doing? What can we learn

1343   from them and how can we make sure we have U.S. leadership to

1344   quote you in the future on the IoT?

1345   Ms. {Schooler.} Thank you. So one of the things that I

1346   noted was some of the advancements in the manufacturing

1347   capabilities in the IoT standards and national policy in

1348   other countries. If you look in areas like Germany, you will

1349   see some of the most highly automated, highly advanced

1350   connected factories in the world. I think there is a lot we

1351   can learn by going into some of these other geographies and

1352   understanding and levering some of the advancements that they

1353   have put into place up until now.

1354   If you look at places like China, they are highly

1355   adopting and supporting things like smart cities where they

1356   are using the technology, not only for manufacturing

1357 capability but also for societal positive impact by looking

1358 at the air quality as an example. We can look at use cases

1359 such as monitoring the health of an oil pipeline, all of

1360 these things, and a lot of it is around predictive

1361 maintenance. I think as we journey as industry over into

1362 these other geographies, understand the deployment

1363 capabilities that are in place. We need to bring that back

1364 into the dialogue that we are having on a regular basis, both

1365 with our other industry partners as well as government to

1366 continue to progress our policy to support some of the

1367 implementations of these technologies moving forward.

1368   Mr. {Olson.} I know there are at least two domestic

1369 groups that are looking at interoperability here in America

1370 and open standards. Is that enough? Should there be more?

1371 Who else should be involved in this? Because let us bring

1372 those jobs back.

1373   Ms. {Schooler.} Standards is an excellent point. We

1374 have the OIC and the IIC which I believe are the two---

1375   Mr. {Olson.} Yes.

1376   Ms. {Schooler.} --consortiums that you are inferring.

1377 One is the Industrial Internet Consortium and the other is

1378 the Open Internet Consortium. In both of those cases, you

1379   are taking very large members of industry, bringing them

1380   together to really set whether it be an architectural

1381   framework or series of test beds that allow for the

1382   understanding of the deployment. It is one thing to set

1383   standards. It is another thing to architect and build

1384   solutions based on those standards.

1385   So in both of those bodies you have not only the

1386   definition of the architecture but the deployment and the

1387   testing of the implementation of that architecture.

1388   So I think those are a good start. I think if you look

1389   from a connectivity perspective, you have efforts in 3GPP

1390   around 5G that are looking at IoT-specific use cases. We

1391   need to continue to put wood behind the arrow on the

1392   connectivity solutions as well. So I think we have a good

1393   start. I think as we continue through the commercial

1394   deployment phase, it remains to be seen as if it is enough or

1395   if we need to extend those standards' efforts further as we

1396   learn more through our initial commercialization efforts.

1397   Mr. {Olson.} Thank you. Mr. Castro, any comments, sir,

1398   on the issue of manufacturing, bringing it back to America?

1399   And Mr. Van Harlingen? Anybody before I get my time run out

1400   here?

1401   Mr. {Castro.} I think you are absolutely right. When

1402   we look at, you know, the opportunity here, the United States

1403   leads in this technology area, and we want to, you know,

1404   regain these manufacturing jobs. The way to do it is by

1405   investing and having the most innovative factories. And when

1406   we look--you know, the examples that I have in my testimony I

1407   submitted for the record, you know, we see U.S. companies

1408   leading in this space on the Intel, Harley Davidson,

1409   Raytheon, you know, these companies that are able to track to

1410   the turn of the screw what is going on in the factory and use

1411   that data to operate more efficiently than anyone else. That

1412   is our competitive advantage. We have to make sure we are

1413   investing in that opportunity. We have to make sure that our

1414   schools that are leading the development of this have the

1415   funding to do that, and that is one opportunity that Congress

1416   might be able to help support further.

1417   Mr. {Olson.} Mr. Harlingen?

1418   Mr. {Van Harlingen.} As a consumer electronics company,

1419   most of our focus is on consumer products. A lot of our

1420   manufacturing is done off shore, but we are constantly

1421   evaluating opportunities to bring manufacturing back on

1422   shore. There have been a couple of instances in some of our

1423 business areas where we have done so, and we are enthusiastic

1424 about doing so. We look forward to IoT technologies brought

1425 by other companies into the manufacturing sector to make that

1426 more possible and more practical for companies like

1427 ourselves.

1428   Mr. {Olson.} Well, come back to Texas. Mr. Morehead,

1429 your final thoughts, sir?

1430   Mr. {Morehead.} I am not as involved in the

1431 manufacturing side, but most of our vendors unfortunately do

1432 use off-shore partners. Where I see the opportunity, though,

1433 here is the fact that we are talking about 25 billion devices

1434 being implemented in the United States or some portion of

1435 that. You can't outsource the installation, activation,

1436 servicing, and redeployment of those devices here in the

1437 United States. So potentially retraining that workforce to

1438 get them intelligent and smart on how to maintain and install

1439 the devices could be another way to engage the workforce in

1440 the United States as opposed to just being dependent on the

1441 manufacturing.

1442   Mr. {Olson.} Thank you. Yield back. Out of time.

1443   Mr. {Burgess.} The gentleman's time has expired. The

1444 gentleman yields back. The chair recognizes the gentleman

1445   Mr. Mullin from Oklahoma for questions, 5 minutes, please.

1446   Mr. {Mullin.} Thank you, Mr. Chairman, and first off, I

1447   would like to thank the CMT staff for organizing the showcase

1448   earlier this morning and of course, all the participants. I

1449   was kind of blown away.

1450   One technology that was out there is brought to you by

1451   Al Sutherland from my state who shared the amazing technology

1452   that has already proven extremely useful to people like

1453   myself in the farming and ranching business. Mr. Sutherland

1454   has a product called the Mesonet where basically--and I hope

1455   I said that right--but basically it has a monitoring station

1456   in all 77 counties throughout the state. One of them is just

1457   located a couple miles from our place. It gives us real up-

1458   to-date information. He was demonstrating the app on the

1459   phone. I had that app downloaded real shortly, considering

1460   that this time of the year we begin to start burning off

1461   fields and then we enter hay season. It is very useful. In

1462   fact, I was very upset that I didn't already have it on my

1463   phone. It would have helped a few times laying that hay

1464   down. You can predict weather only so well. Well, it gives

1465   us some great technology.

1466   So it shows itself very useful out there. But there is

1467 been some fear around technology. There is this group of

1468 people out there that says, you know, it is going to

1469 eliminate jobs. And so for our panel, whoever wants to

1470 answer this, how do we combat that fear? You know, people

1471 automatically fear things that they don't understand. We see

1472 that all the time. But there is an argument being said that,

1473 look. If we go so far and we start continuing getting smart

1474 machines, our unemployment is going to rise. Go ahead,

1475 ma'am.

1476   Ms. {Schooler.} Yes, I think we need to continue to

1477 communicate the positive impacts that we see by doing things

1478 like the smart manufacturing use case that we talked about

1479 earlier. As I noted Intel implemented a smart capability

1480 within our own factory, and it provided a $9 million savings

1481 in just one factory. And what was that savings based on?

1482 Equipment utilization rates, predictive and preventative

1483 maintenance, and for every time you institutionalize one of

1484 those learnings, you bring down product cost. You bring down

1485 product costs, you get more competitive on a world-wide

1486 basis, and you have the opportunity to bring jobs back to the

1487 United States.

1488   In those cases, I think we need to get much more

1489   aggressive in sharing those stories and sharing those

1490   learnings to balance out some of the fear and uncertainty

1491   that are put into the press around the other use cases where

1492   the news is very negative around job destruction.

1493   Mr. {Mullin.} All right.

1494   Ms. {Schooler.} I noted the data point earlier that in

1495   the January Accenture survey, 87 percent of the CEOs believe

1496   it is going to create new jobs. Mr. Morehead noted that,

1497   even in some cases if it is a consumer device and it is being

1498   manufactured off shore, these still need installed. There

1499   are still services. There are still new information-type

1500   positions that are going to be created. It may not be in all

1501   cases the types of jobs that we are used to today, but it

1502   will result in job creation moving forward. I am very

1503   passionate about that.

1504   Mr. {Mullin.} So how do we educate the people? Do we

1505   start putting these in trade schools? Do we start in high

1506   school? How do we implement it? And that is for anybody on

1507   the panel that wants to try answering this.

1508   Mr. {Castro.} I will jump in. I mean so, you know,

1509   there is myth that robots or automation kill jobs. I think

1510   part of that is an education problem that, you know, better

1511   economics lessons will teach people that, you know, if you

1512   look at the history--you know, I mean, if we want full

1513   employment, yeah, we can get rid of John Deer and all the

1514   tractors on farms and, you know, problem solved. That is not

1515   what we want to do. We want to lower prices for consumers.

1516   We want more efficiency. And most of the Internet things

1517   examples that we are talking about, they are addressing these

1518   issues. They are addressing, you know, productivity on

1519   farms. You look at safety issues, you know, automation with

1520   grain bins, you know, making workers safer. That is not

1521   eliminating jobs. That is actually improving quality of

1522   life.

1523   So I think once people start to see how this actually

1524   helps them, they are going to realize it is not technology to

1525   be feared but that technology improves their life.

1526   Mr. {Mullin.} Anybody else?

1527   Mr. {Van Harlingen.} So agreed. You know, this

1528   technology promises, like any new technology, it is going to

1529   bring change. Hopefully it will bring manufacturing

1530   opportunities back to the United States, and that will create

1531   jobs. But it is also going to create different types of

1532   jobs. As we mentioned in the service industry and things

1533   like that, I think it is going to be important to invest in

1534   education to prepare people for those new types of roles.

1535   Mr. {Mullin.} Thank you. I appreciate your time and

1536   once again appreciate the CMT putting this hearing together.

1537   Thank you. I will yield back.

1538   Mr. {Burgess.} The chair thanks the gentleman. The

1539   gentleman yields back. The chair recognizes Mr. Harper from

1540   Mississippi 5 minutes for questions, please.

1541   Mr. {Harper.} Thank you, Mr. Chairman, and thanks to

1542   each of you for being here today and really exciting to see

1543   the stuff on display this morning at the showcase, and I was

1544   obviously very happy to see Camgian Microsystems there which

1545   had a display on their new product, Egburt, so Gary Butler

1546   who started that. It is pretty remarkable what it does and

1547   can be used for a broad range of remote monitoring including

1548   the infrastructure help for say bridges and dams, and the

1549   future looks great for our country and to make sure that we

1550   have the innovation that we need and how we handle that, how

1551   we do it from Congress. So thank you for adding your insight

1552   to that.

1553   Mr. Castro, I know we discussed the governance aspect of

1554   this already, but within that Internet of Things, would there

1555 be a difference on that governance based upon the specific

1556 product or machines in that variance there? What would you--

1557 how would you comment on that?

1558   Mr. {Castro.} Absolutely. I think, you know, the

1559 traditional way that Congress has looked at a lot of data

1560 issues is industry specific. I think that is a very useful

1561 framework. And it, you know, differentiates us from Europe

1562 which has these broad-based privacy rules. And I think that

1563 is one of the reasons we were so much more successful I this

1564 space.

1565   But going forward, we should continue to do that. We

1566 should look. Are there areas where people have particular

1567 sensitivities? Maybe it is in education. Maybe it is in

1568 healthcare. We have different rules there, but we allow that

1569 same flexibility of sharing data throughout all of those

1570 sectors.

1571   Mr. {Harper.} And so should that governance even

1572 different within itself be different than other industries,

1573 let us say? Give me a little bit more meat on the bones for

1574 that.

1575   Mr. {Castro.} Yeah. So you know, it really depends I

1576 think on what the consumer harm is that we are trying to

1577   protect against. So for example, you know, a really good

1578   example that we have historically is discrimination against

1579   pregnant women when they go to apply for a job. You know,

1580   that is something that we don't want to have happen. So we

1581   restrict that use. It doesn't matter how you found that

1582   information out. It doesn't matter if it is accurate or not.

1583   It doesn't matter if you guessed it from, you know, using

1584   some kind of in-home smart system or you, you know, just saw

1585   someone walking down the street. The point is we regulate

1586   the use. And that is what we want to do. We want to look

1587   very clearly at what it is we don't want to have happen and

1588   make that illegal. And that provides consumers with

1589   confidence no matter where their data goes, or if there is a

1590   data breach, they are still safe.

1591   Mr. {Harper.} Well, what we want to make sure of from

1592   our end is we don't issue some regulation or enable some

1593   regulation that stifles innovation within the creative

1594   industry. And so that sometimes is a tough balancing act.

1595   But it seems to allow for more innovation if we get out of

1596   the way sometimes and don't create that roadblock at the

1597   beginning.

1598   Ms. Schooler, if I could ask you, do you see an overlap

1599 between consumer uses and enterprise or industry use of the

1600 Internet of Things?

1601   Ms. {Schooler.} I will respond to that in two factions.

1602   Mr. {Harper.} Okay.

1603   Ms. {Schooler.} I think from a privacy concern the use

1604 cases are very different. As Mr. Castro noted, I think the

1605 consumer privacy issues are going to need to have a specific

1606 type of set of considerations around how you share

1607 information, what personal information you share, versus in

1608 an enterprise implementation, you are really collecting,

1609 analyzing data within the confines of your own enterprise

1610 yourself. So I think those use cases will be very different.

1611   The area that I do think that we can leverage learnings

1612 is in security. I think if we look at security as a

1613 foundational element built in from the onset of

1614 implementation, there is a couple different vectors that we

1615 have to consider. One, you need to secure the device, the

1616 network, and the cloud because all are critical on-ramps into

1617 the Internet of Things. And if you only secure one of those

1618 assets and not the entire pipeline, if you will, I think that

1619 is an insufficient way to look at the architecture from a

1620 device to a cloud perspective. So that is one.

1621   Number two, I think we not only need to build in

1622   intellectual property into our silicon architectures and we

1623   are doing much of that at Intel, we also need to also build

1624   upon that software that monitors and manages those security

1625   concerns. The unique position that we are in at Intel is

1626   that we have both assets. So we are looking at how do we not

1627   only secure the device to the network to the cloud, how do we

1628   do it in silicon and how do we do it in software, such that

1629   we can create the most robust, secure, IoT implementation

1630   possible across consumer, industrial, and commercial

1631   implementations.

1632   Mr. {Harper.} Thanks to each of you, and I yield back

1633   the balance of my time.

1634   Mr. {Burgess.} The gentleman yields back. The chair

1635   thanks the gentleman from Mississippi. Seeing no other

1636   members wishing to ask questions, I do want to thank the

1637   witnesses and the members for participating in today's

1638   hearing. Before we conclude, I would like to include the

1639   following documents to be submitted for the record by

1640   unanimous consent: A letter on behalf of the Consumer

1641   Electronics Association.

1642   [The information follows:]

1643   *************** COMMITTEE INSERT ***************

|

1644   Mr. {Burgess.} Pursuant to committee rules, I remind

1645 members they have 10 business days to submit additional

1646 questions for the record. I ask that the witnesses submit

1647 their response within 10 business days upon receipt of those

1648 written questions. I also want to take just a moment and

1649 thank the subcommittee staff for their hard work on the

1650 showcase this morning. I thought it was very informative and

1651 instructive, and without objection, the subcommittee is

1652 adjourned.

1653   [Whereupon, at 12:30 p.m., the Subcommittee was

1654 adjourned.]